Emergency Telecommunications Service (ETS)

Outputs

- Technical contributions to ANSI Working Group T1A1.2.

- Technical contributions to ITU-T Study Group 9.

- Report to NCS on baseline computer simulations for network survivability and ETS studies.

In the aftermath of the recent terrorist attacks, the Federal Government has become very interested in priority treatment for emergency communications. While the Government Emergency Telecommunications Service (GETS) has served emergency workers well for many years, it is limited to the Public Switched Telephone Network (PSTN) and to the United States. ETS is envisioned as a GETS-like service that will be available internationally and encompass virtually all wireless and wireline communications networks. The types of traffic to be carried include voice, video, database access, text messaging, e-mail, ftp, and web-based services.

The ETS effort at ITS encompasses several projects, including Packet-Switched Networks, and Network Survivability and Restoral. For both of these projects, computer simulation, laboratory studies, security analyses, and traffic engineering are used to support Critical Infrastructure Protection (CIP) initiatives. These two projects are funded by the National Communications System (NCS). This work supports NCS in its mission to protect the national security telecommunications infrastructure, and to ensure the responsiveness and survivability of essential telecommunications during a crisis.

In the first project, Packet-Switched Networks, ITS develops and verifies ETS Recommendations for ITU-T Study Group 9. The major goal of this project is to ensure that future ETS mechanisms will interoperate over broadband cable television networks. Additionally, the project is working to facilitate the evolution of GETS over the IPCablecom network.

The second project, Network Survivability and Restoral, provides ETS expertise relating to Network Survivability for ANSI-accredited Technical Subcommittee T1A1. Within this project, an ITS engineer served as co-editor of a new T1 technical report: T1.TR.79-2003 "Overview of Standards in Support of Emergency Telecommunications Service (ETS)." An ITS engineer is now serving as editor on three new draft Standards and Technical Reports related to ETS in T1A1.2.

Traditional analysis methods are not adequate to predict the effects of large service outages in the current and future network environments. Therefore, ITS is using network modeling and simulation tools to address the needs of T1A1.2, NS/EP, and the Nation. While modeling and simulation are powerful tools for the assessment of threats
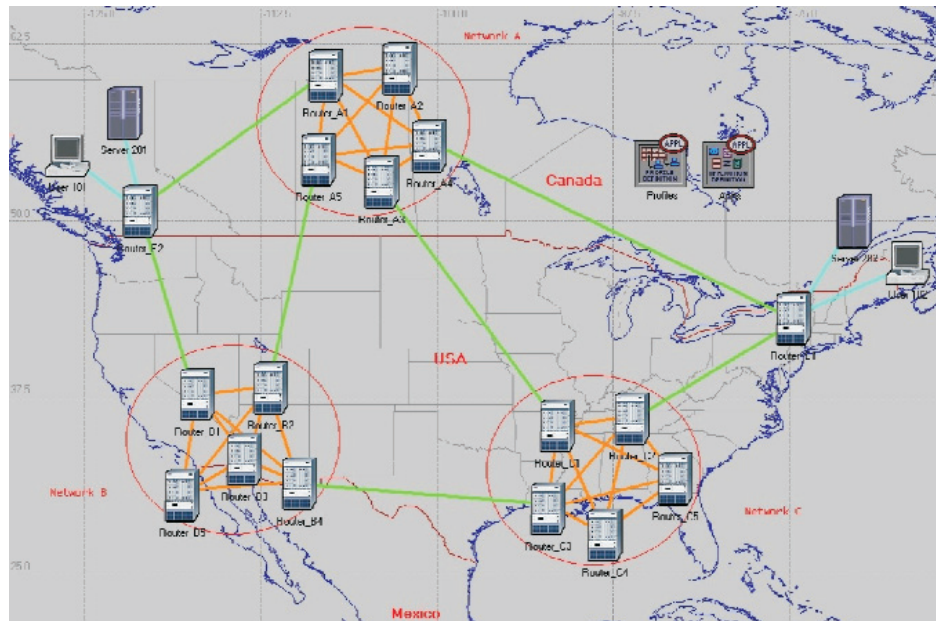

Figure 1. Simulation for testing routing protocols.

and mitigation techniques, the simulations must be well grounded in the physical measurement of important parameters. One goal of the project has been to produce baseline models for reference network architectures that can be used in standards development as well as in future network research by ITS and others. Figure 1 on the previous page shows a model developed to investigate aspects of routing protocols. In Figure 1, the orange lines represent links that are internal to a network and use an Internal Gateway

Figure 2. Laboratory setup for testing security and ETS protocols.

Protocol (IGP). The green lines represent links that connect the different networks. These links use an External Gateway Protocol (EGP) such as BGP4. Within a network, most of the nodes will share the same network prefix, so the IGP can optimize the route that a packet takes to the destination node once it arrives in the network. An EGP exchanges higher-level information between networks so that the packets can be sent to the appropriate network for distribution. The BGP4 protocol has some convergence issues that this simulation, and similar ones, can help to identify.

The standardization work in ITU-T Study Group 9 is focused on the IPCablecom family of Recommendations. These Recommendations define the protocols and signaling to be used on broadband cable television networks to support telephony, multimedia, and Internet access. The IPCablecom Recommendations have just recently been standardized and they are currently in production worldwide. One of the goals of this project is to identify where additions or changes might be needed to support the ETS. This effort also involves work with the Internet Engineering Task Force (IETF) since many of the underlying protocols used in IPCablecom (as well as some of the ETS mechanisms) are under development in the IETF. An ITS engineer serves as the Editor of Draft New Recommendation J.TDR, "Requirements and Specifications for Telecommunications for Disaster Relief over IPCablecom Networks," in Study Group 9.
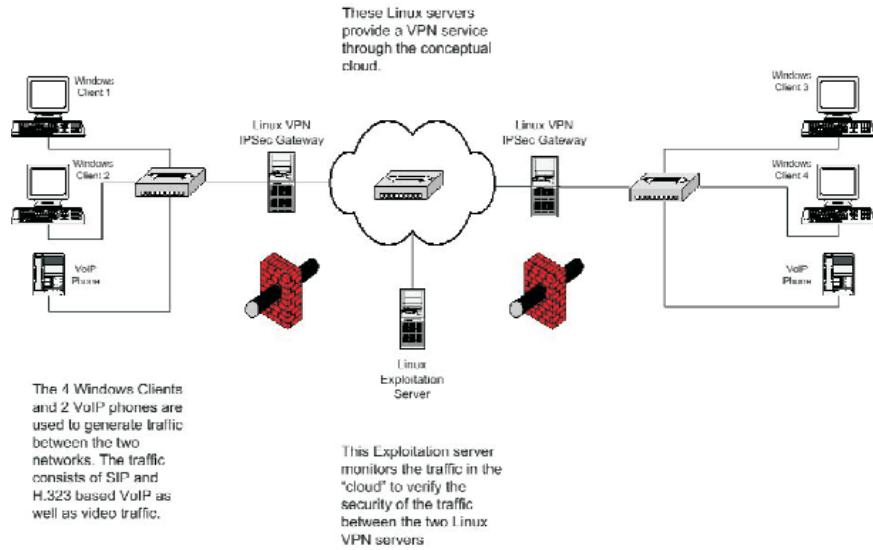
Another important study underway at ITS is a series of tests of GETS over IPCablecom networks. The evolution of GETS from a PSTN-only service to one which will interoperate over the wireless, IPCablecom, and Next Generation networks (NGN) is one of the goals of NCS. Determining the security needs of ETS in IPCablecom networks is another goal of the ETS effort. Figure 2 above shows a laboratory setup to test proposed ETS mechanisms over virtual private networks (VPNs) and through firewalls. The lab setup is currently used to test the performance of videoconferencing and Voice over IP over SIP. Proposed ETS mechanisms will be coded and tested over the same network to determine if they are viable from a Quality of Service (QoS) standpoint.

In FY 2004, ITS will continue to address work on the development and standardization of ETS in T1A1, the IETF, and ITU-T Study Group 9. The projects will address technologies in the NGN and interactions with the IPCablecom networks. This work on ETS must of necessity be conducted with the help of representatives from network providers and cable television equipment manufacturers, as well as NCS. The work in FY 2004 will focus on survivability and security in the NGN ETS as well as GETS compatibility in the IPCablecom networks.

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